1. A microelectromechanical system (MEMS) switch comprising:

a cavity (250);

at least one conductive path (20) integral to a first surface bordering said cavity (250);

a flexible membrane (60) parallel to said first surface bordering said cavity (250), said flexible membrane (60) having a plurality of actuating electrodes (70) attached thereto; and

a plunger (40) attached to said flexible membrane (60) in a direction away from said actuating electrodes (70), said plunger (40) having at least one conductive surface (30) to make electrical contact with said at least one conductive path (20).

2. The MEMS switch as recited in claim 1, wherein each of said actuating electrodes (70) is energized by a DC voltage of opposite polarity to the DC voltage of said adjoining actuating electrodes (70), wherein said DC voltages are referenced to an arbitrary ground.

3. The MEMS switch as recited in claim 1, wherein an electrostatic attraction between said actuating electrodes (70) results in a bending curvature of said flexible membrane (60) when said actuating electrodes (70) are energized.

4. The MEMS switch as recited in claim 1, wherein said flexible membrane (60) is made of a dielectric material selected from the group consisting of SiO, SiN, carbon-containing materials that include polymers and amorphous hydrogenated carbon, and mixtures thereof.

5. The MEMS switch as recited in claim 1, wherein said flexible membrane (60) is further comprised of a plurality of conductive vias.

6. The MEMS switch as recited in claim 1, wherein the bending curvature of said flexible membrane urges said at least one conductive surface (30) of said plunger (40) against said at least one conductive path (20) integral to said first surface bordering said cavity (250), closing the MEM switch.

7. The MEMS switch as recited in claim 1, wherein the removal of said applied voltage returns said flexible membrane (60) to its original shape, pulling away said at least one conductive surface (30) of said plunger (40) from said at least one conductive surface integral to said first surface bordering said gap, opening the MEM switch.

8. The MEMS switch as recited in claim 1, wherein the bending curvature of said flexible membrane (60) is a concave displacement

9. The MEMS switch as recited in claim 1, further comprising a second plurality of electrodes (74) placed on a bottom surface of the flexible membrane (60), wherein a reverse positive and negative voltage applied to said second plurality of electrodes (70) urges said plunger (40) away from said at least one conductive path (20), overcoming stiction.

10. The MEMS switch as recited in claim 1, wherein a piezoelectric material integral to said flexible membrane (60) and positioned between said actuating electrodes (70) expands and contracts said flexible membrane (60) when subjected to a DC voltage.

11. The MEMS switch as recited in claim 1, wherein depending on said piezoelectric material and its crystalline orientation, applying a voltage difference between said actuating electrodes (70) forces said flexible membrane (60) to adopt a concave or convex curvature.

12. The MEMS switch as recited in claim 1, wherein said piezoelectric material is selected from the group consisting of $BaTiO_3$, $Pb(ZrxTi1\text{-}x)O_3$ with dopants of La, Fe or Sr, and polyvinylidene fluoride (PVDF).

13. The MEMS switch as recited in claim 1, wherein a gap (25) within said cavity (250) separates said plunger (40) from said at least one conductive path (20).

14. The MEMS switch as recited in claim 1, wherein the flexible membrane (60) is electrostatically displaced in two opposing directions, thereby aiding to activate and deactivate the MEMS switch (15).

15. A micro-electromechanical system (MEMS) switch comprising:

a) a substrate (18) comprising a conductive metal inlaid path (20) onto which a cavity (250) is formed;

b) on said cavity (250), a first release layer (125) followed by a first conductive layer (130) and by a second conductive or dielectric layer (140), said two conductive layers (130, 140) being patterned into the form of an inverted 'T' (131, 141);

c) a planarized second release layer (72) followed by a third conductive layer (60);

d) on top of said third conductive layer (60), a dielectric layer and patterned vias holes (69) to expose a lower conductor;

e) a conductive surface filling said patterned via holes (69) providing a finite thickness above said filled via holes, said conductive surface patterned into the shape of actuating fingers (70), said combination of a) through e) forming a flexible membrane; and

f) via holes perforating said flexible membrane and simultaneously providing access slots (80) outside of said membrane, wherein air replaces said first and second release layers (125, 126).

16. The MEMS switch as recited in claim 15, wherein said conductive layers include metal traces made of conductive metal elements selected from the group consisting of Al, Cu, Cr, Fe, Hf, Ni, Rh, Ru, Ti, Ta, W, Zr and alloys thereof.

17. The MEMS switch as recited in claim 16, wherein said metal traces include elements selected from the group consisting of N, O, C, Si and H, as long as said metal traces are electrically conductive.

18. The MEMS switch as recited in claim 15, wherein said flexible membrane and said dielectric layers are made of a material selected from the group consisting of carbon-containing materials (including polymers and amorphous hydrogenated carbon), AlN, AlO, HfO, SiN, SiO, SiCH, SiCOH, TaO, TiO, VO, WO, ZrO, and mixtures thereof.

19. The MEMS switch as recited in claim 1[illegible] wherein said release layer is a sacrificial layer which is made of a material selected from the group consisting of borophosphosilicate glass (BPSG), Si, SiO, SiN, SiGe, a-C:H, polyimide, polyaralene ethers, norbornenes, and their functionalized derivatives, including benzocyclobutane and photoresist.

20. A single-pole-multiple-throw MEMS comprising a plurality of single-pole-single-throw MEMS switches placed in parallel, said plurality of single-pole-single-throw MEMS switches being respectively activated by an independent DC voltage control signal.

